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ANNUAL REPORTS

The Academy of Natural Sciences

OF

Philadelphia

FOR THE YEAR ENDING NOVEMBER 30, 1920.

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PHILADELPHIA

1921



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The Academy of Natural Sciences

OF

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FOR YEAR ENDING NOVEMBER 30, 1920.

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UPPER—TREE YUCCAS ON THE DESERT BETWEEN WILLCOX AND THE CHIRICAHUAS.

LOWER—ENTRANCE TO PINERY CANYON, CHIRICAHUA MOUNTAINS, SHOWING OAK SCRUBS IN THE BOTTOM, SCATTERED VEGETATION ON THE SLOPES, AND RIM ROCK ON THE SUMMIT.

## Special Reports by Members of the Scientific Staff based on Recent Explorations Con- ducted in the Interests of the Academy.

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### EXPLORATIONS IN THE CHIRICAHUA MOUNTAINS, ARIZONA.

BY WITMER STONE, SC. D.

The mountain ranges of southern Arizona present peculiar attractions to the zoologist and botanist in their isolation and the opportunities they afford for the study of the zonal distribution of life.

Rising from the wide spread Arizona desert their highest peaks reach an elevation of eight or nine thousand feet, and in climbing their slopes one passes from a region of cactus and yucca through belts of oak, juniper and pine to splendid forests of Douglass fir and finally bald peaks flanked by aspen thickets, the existence of which would never be suspected by the traveller on the desert but a few miles away. The differences in animal and plant life encountered in the ascent are about as striking as one would experience in travelling from South Carolina to Canada along our Atlantic coast.

The Chiricahuas, in the southeastern corner of the State, had always appealed to me as their botany had not been thoroughly reported upon, while the periodic visits of the thick-billed parrots of Mexico made the possibilities of their bird life interesting.

An opportunity for visiting these mountains came in the spring of 1919 through an invitation from Mr. and Mrs. J. Eugene Law of Berkeley, California, for Mrs. Stone and myself to join them as guests on a camping trip to Pinery Canyon on the western slope of the range.

Reaching Willcox on the Southern Pacific Railroad on the morn-

ing of May 19, we travelled southward on a narrow-gage branch some 20 miles to a little Mexican town, Dos Cabezos, nestling among the barren cones of the Dos Cabezos hills, a crescent shaped northern extension of the Chiricahuas. Thence by automobile we travelled some 35 miles farther across the intervening desert to our destination.

This part of the "desert" is largely composed of hard baked, reddish, clay soil which grinds into a fine dust and in the rainy season becomes a thick, sticky mud, which impedes travel to an extent not dreamed of in the dry, sunny days of spring and early summer.

On the Dos Cabezos hills the only flowering plants were the tall wand-like ocotillos, their stems armed with thorns almost as rigid as steel and bearing on their tops spikes of brilliant red blossoms, shining like tongues of flame in the sunlight. Besides a few tufts of prickly pear (*Opuntia*), there was no other vegetation except the scattered tufts of low prostrate herbs more or less covered with the soil. On the flat stretches of the "desert" there were scattered mesquite bushes and everywhere the low tufted buffalo grasses. The dry washes full of large and small pebbles and banks of sand were bordered by taller yellow grasses, whose lighter colors offered the only relief from the uniform reddish brown that stretched away on all sides. Far away ahead of us were the purple masses of the Chiricahuas and on other sides were other more distant, pink and purple mountains, lying farther and farther away, and changing from one tint to another as the sun sank lower in the west.

Now and then we passed scattered groves of tree yuccas, hundreds and hundreds of single or branched shaggy trunks surmounted by their prickly crowns of narrow needle-pointed leaves, from the midst of which rose the new flower stalks, at this season closely resembling gigantic "spuds" of asparagus.

White-necked ravens flew from one to another, and an occasional road-runner made off from behind one of the trunks. Scaled or "cottontop" quail flushed constantly from our track and where large patches of Sackaton grass occurred, jack rabbits and cottontails were to be seen scurrying here and there for shelter. Two species of lizards, *Holbrookia* and *Cnemidophorus* ran along the ruts ahead of our car with lightning-like rapidity. As we approached closer to the mountains, vegetation became more varied and great fields of giant white poppies stretched out to meet us, while along the creek that extended out from Pinery Canyon, to finally disappear

in the desert, there appeared a straggling line of trees, mostly Arizona cottonwoods, which became larger and more numerous as we approached the mouth of the Canyon.

Here bird life was very much in evidence. Colonies of Arkansas kingbirds flew from the tops of the cottonwoods with great clamor; here and there a vermilion flycatcher fluttered down through the air like a brilliant autumn leaf as he performed his flight song. Mockingbirds and lark sparrows were in full voice, and Arizona, Bullock's, and Scott's orioles were to be seen in the tree tops.

The bare rounded hills that now appeared on either side were capped by numerous agaves or century plants their great clusters of spiny, fleshy leaves showing conspicuously while their flower stalks, later to tower up like giant candelabra, were now in the same early asparagus condition as those of the tree yuccas, but of much greater diameter and already two to three feet high.

As we entered the canyon, the trail at once began to ascend. A line of rim rock soon loomed above us on either side half a mile or more distant, marking the sides of the canyon, and as we advanced they gradually converged, while the high peaks which had been before us all the while seemed to sink down behind the lower ones immediately before us.

The lower, scrubby oaks looked to an easterner like holly bushes, the leaves being small and of much the same outline, with similar spiny margins. The taller species, with their gnarled trunks and spreading branches reminded one of apple trees, and the scattered oak woods recalled old deserted orchards in the east, though they, like the scrub oaks, have the holly-like leaves. At the time of our arrival the old leaves were all being shed and the new ones just budding so that the ground was covered with a brown and yellow carpet recalling autumn rather than spring.

Conspicuous among the shrubs was the Apache plume with its white blossoms like those of the blackberry and very short linear leaves. Later the clusters of seeds develop long plume like appendages of delicate pink, producing a beautiful effect as the sunlight plays upon the bushes, and reminding one of the mist trees of our gardens.

At a little cabin in the midst of the oaks and close to the rocky stream, which was now nearly dry, we made our headquarters, thanks to the hospitality of Mr. and Mrs. Frank Hands, whose ranch lay a little farther down the canyon and whose brother, then absent, owned the cabin.



Here a large part of our collecting was done and a more delightful camping ground could hardly be imagined. Birds were abundant. Cassin's kingbird and the black-headed grosbeak had nests in the oaks above our tents and the diminutive elf owl, *Micropallas whitneyi*, the smallest owl in the world, came about the cabin in the evening, while Gambel's quail, named after its discoverer Dr. William Gambel a former Secretary of this Academy, ran about in groups feeding among the fallen leaves. Troops of Arizona jays skulked about in the trees ever ready to give warning in harsh cries whenever we sallied forth; ant-eating woodpeckers perched silently on the tops of dead oak trees while at night both the Stephens' whippoorwill and the poor will called continually from just behind our camp.

There were numerous conspicuous yellow composites in bloom in early summer over the floor of the canyon, brilliant scarlet painted cups too and acres of blue lupines, and immense yellow primroses, while in the bed of the almost dry stream grew beds of golden yellow *Mimulus* with large, pale, yellow columbines scattered along the banks. The purple-flowered Arizona locust was the most showy of the trees, though a wild cherry, similar to our eastern species, was also conspicuous, and the great spherical tufts of greenish yellow mistletoe like birds' nests, scattered along the branches of both oaks and pines, at once attracted the attention of a stranger.

Here too, scattered patches of alfalfa in full bloom attracted hordes of butterflies and other insects, and later, when the scarlet Penstemons came into blossom, hummingbirds of several species were almost always present. Late in June we moved our camp some two miles farther up the canyon to an elevation of about 6500 feet, at the end of the old wagon trail constructed by early settlers, many of whom lie beneath rough stone piles in the scrub nearby, victims of the Apaches who found in these mountains their last stronghold. About our tents at this upper camp came birds that we had not encountered farther down, notably the painted redstart, similar in habits to our eastern bird but with a much striking color combination of jet black, crimson-red and white, and the sulphur-bellied flycatcher, both Mexican species which cross the line only in these southern desert mountains.



UPPER—BARFOOT PEAK 8826 FEET, ONE OF THE SUMMITS OF THE CHIRICAHUA MOUNTAINS.  
THE PEAK IS BARE ROCK FLANKED BY ASPEN THICKETS.

LOWER—CAVES FORMERLY USED BY THE INDIANS IN THE RIM ROCK AT THE ENTRANCE TO BONITA CANYON.





From this point the foot trail led to the high peaks, and an hour's climb brought one to a surprisingly different environment.

The oaks and Chihuahua and Apache pines gave way to Douglas fir and Mexican white pine; the shrubs and herbs took on a more familiar appearance, and instead of the strange plants of the desert one found raspberries, strawberries, everlasting, violets, pipsissiwa, larkspur, buttercups, and a brilliant red columbine more nearly like our eastern species.

Of birds these high forests harbored juncos, crossbills, nuthatches, chickadees, warblers of several species, crested jays, and the band-tailed pigeon - similar in a general way to the avifauna of our eastern mountains, though the birds were all different species or slightly different geographic varieties.

As the summer advanced the heavy thunder storms, characteristic of the region, came on. The mornings would be beautifully clear, but about noon the clouds would gather and we would be treated to a terrific cannonading from the heavens. The rain came down in torrents and our little stream which had almost dried up was soon roaring along full to the banks.

Vegetation made great strides and many low herbs which we had found in bloom in May blossomed again in late July. The greatest change however took place on the desert and as we gazed at it, far away, from the heights of Ida's and Barfoot peaks, we could clearly see a green flush spread over it day by day concealing the bare reddish brown stretches of early summer. Later on, in August, when we had an opportunity of studying it close at hand as we crossed it to the railroad, we found numbers of plants that we had not encountered before, mainly growing in dense tufts and mats, and gay with blue, red and yellow flowers, while the long trailing vines of gourds and similar species stretched in all directions like the tentacles of some great octopus.

The collections brought back to the Academy represent nearly all the plants found in Pinery Canyon from the desert to the high peaks at its head which bloom before August 1, numbering somewhat over 1000 sheets (450 species), as well as some 75 species of birds (202 specimens), 15 mammals (40 specimens), 15 reptiles and batrachians (75 specimens), and 650 species of insects (5000 specimens).

The extent of the collection is due in the first place to the generous hospitality of Mr. and Mrs. Law, and to the valuable advice and assistance of Mr. and Mrs. Frank Hands, as well as in no small

degree to the assumption of most of the camp duties by the ladies of our party, affording us every possible opportunity to prosecute our work.

The insect collections have been largely identified. Dr. Henry Skinner has studied the Lepidoptera; Mr. Frank Mason, the Coleoptera; Mr. J. A. G. Rehn, the Orthoptera; Mr. H. L. Viereck, the Hymenoptera; and Mr. W. L. McAtee, the Hemiptera; while Mr. E. T. Cresson, Jr. is at work upon the Diptera. Several new species have been found and quite a number formerly known from south of the Mexican border have been definitely added to the fauna of the United States.

The plants have been largely indentedified by the late Stewardson Brown and a report on them is in preparation. As Mr. Law is engaged upon a comprehensive study of the birds and mammals of the Chirichuas the report upon them has been left entirely to him.

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### HAWAII REVISITED.

BY HENRY A. PILSBRY, SC. D.

At three o'clock one morning last July, I was leaning over the rail of a Pacific steamer. Let me hasten to add that I am a "good sailor". It was the excitement of again seeing Hawaii and meeting old friends there which robbed me of sleep. Low in the southern sky hung the Southern Cross, and below it a brighter "variable" star, the Molokai Light, against the dark Molokai mountains.

My errand was to take part in the first Pan-Pacific Scientific Conference, held in Honolulu during August, and about twenty of my shipmates were delegates from museums and universities of the United States and Canada. Having seen that the islands were still there I turned in, and when I woke again we were off the south coast of Oahu.

Except where irrigated, the shore zone is rather arid. The approach to Honolulu is past austere gray tufa cones, Koko Head, Diamond Head, formed by eruptions of volcanic ashes, the final explosions of the fires below. A thin green line of algarobas<sup>1</sup> borders the shore and straggles up the gullies, with groups of coco palms here and there. With further acquaintance the lower zone

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<sup>1</sup> An introduced species of mesquite (*Prosopis*).





UPPER--RICE FIELDS BEYOND PEARL HARBOR, OAHU, THE WAIANAC MOUNTAINS IN THE DISTANCE. HERE AND THERE STAND COCOA PALMS, REFLECTED IN A MIRROR OF SILVER AND PALE GREEN.

LOWER--LOOKING NORTHWEST OVER THE NUUANU PALI (A 700 FOOT CLIFF). IN THE MIDDLE DISTANCE THE PRECIPITOUS WINDWARD WALL OF THE MAIN RANGE RISING ABRUPTLY FROM THE BARE-LEVELED PLAIN. KANEOHE BAY IN DISTANCE ON THE RIGHT.



UPPER—HONAUAU BAY, HAWAII. NATIVE OUTRIGGER DUGOUTS HAULED UP. AMONG COCOA PALMS IN THE DISTANCE ARE THE RUINS OF THE GREAT CITY OF REFUGE OF THE WAR-LIKE OLD TIMES.

LOWER—CAVE IN A LAVA FLOW ON THE FLANK OF KILAUEA. SUCH CAVES, OFTEN MILES IN LENGTH, ARE FORMED BY THE OUTFLOW OF HOT LAVA BELOW, AFTER THE SURFACE HAS HARDENED. HERE SECTIONS OF THE ROOF HAVE FALLEN.





does not gain much in interest. It is over run with introduced plants. In places the detestable prickly pear and lantana cover the foothills. Introduced species of ants, slugs, the minah bird, and the English sparrow, are everywhere in evidence. There are a few native trees, such as the hau, a *Hibiscus* often having incredibly twisted, snaky branches, sometimes utilized as a canopy for open air lanais. The screw palm, *Pandanus*, often grows along the shore. The wonderful forests of tree ferns, the tree Lobelias and tree composites are to be seen only higher up, mainly above the thousand foot level.

Where there is irrigation and cultivation, as around Honolulu, a multitude of beautiful and stately foreign plants flourish; the royal palm, *Poinciana*, monkey-pod, and golden shower (*Cassia*), are everywhere. Also fine banyans, each a grove in itself, and many graceful species of palms. Hedges of crotons and hibiscus are gay throughout the year.

On the lower levels and up the mountain slopes some 600 or 800 feet are great cane fields, which produced about 600,000 tons of sugar in 1920, earning huge dividends for the sugar companies. Where water for irrigation is not available, pineapples replace the cane. In the low valleys where there are natural streams, rice and taro are cultivated, both growing in water. The taro root, roasted, pounded and fermented, furnishes poi, a smooth, paste-like, starchy food, the chief bread stuff in the old days.

All of these crops are dependant upon water from the mountains mainly brought through long ditches which wind along the mountain spurs high on the valley sides. They derive their water from tunnels driven into the mountains to tap the porous strata under the rain forest above.

Though the lower zone is now more or less arid, there is evidence that this is largely a recent condition. In many places there are deposits containing land shells in great profusion, partly of extinct species, and often near sea level. These animals require moisture and forest conditions. During the Pleistocene period the islands must have been verdant nearly to the water's edge. The dessication has no doubt been accelerated by the destruction of forests, but it was evidently in progress before the coming of man.

Every visitor feels the charm of this "loveliest fleet of islands that lies moored in any sea" as Mark Twain has said. The glamour of the Pacific possesses one. Years drop away, and with a

fresh mind one looks upon a new and beautiful world. To the naturalist Hawaii has a further interest. It is the most isolated island group in the world. Over 2000 miles from America and Samoa, over 3000 from Japan, the fauna and flora of these islands have developed in their own way, little affected by the waves of life evolved on the continents and successively sweeping their predecessors out of existence. Birds, bats, insects and seeds which could be blown or float great distances could from time to time reach Hawaii. Creatures less capable of crossing the sea are either absent (mammals, amphibians) or are represented by ancient groups which here linger on beyond their time. The tree shells (*Achatinella*) belong to such a group, which long ago had its day on the continents and was then replaced by more highly organized snails.

In Hawaii the tree shells are known to every schoolboy. They collect them as we used to collect birds' eggs or stamps. The native Hawaiians formerly strung them into wreaths. They call them *pupukaneoe*, singing shells, claiming that they make a wild, entrancing music in the forests. Achatinellas are glossy, jewel-like shells of many colors, green, brown, rose or gray, often banded, or pure white. Every ridge has its special species or patterns. When we were going for tree shells a start would be made the day before, camping at the limit of motor travel. Early next morning found us on the trail, headed for the ridge. As in the desert mountains of Arizona, the best shells are always on the highest ridges and peaks. Perhaps we will find them hanging on the bushes and trees by scores; it is like picking blackberries; but usually they are scarce and hard to see. On leaves, in crevices of the bark and knot-holes they stick, often ten or twenty feet high, indeed to the tree-tops. It is a climbing proposition. About the time we begin to find them it rains. This is not the "liquid sunshine" they talk about in Honolulu. It is a pour. After that you do not shy at puddles or wet foliage, knowing that the raiment can retain only so much water.

Where there is no trail, progress is usually difficult in the mountain forest. There are places where the ieie (a climbing *Pandanus*) is so thick that it is easier to scramble over it, ten feet from the ground, than to crawl through in the mud. Dense fern patches are even worse to negotiate. But if you really want to see the native birds, shells and insects, it is worth the trouble.



The native Hawaiians, sometimes called kanakas, from the Hawaiian word for man, are very dark-skinned people, finely built, with good features not unlike the Caucasian except that the lips are rather thick. They form now about a sixth of the population, and their blood is a good deal mixed with Portuguese and Chinese. Practically all speak English, and they are well represented in the Territorial Legislature.

Hawaii was discovered and settled by the Polynesians about the year 1000 to 1100, according to tradition and native genealogies. The adventurous colonists were probably from Samoa. Did pressure of population drive them forth to discover new islands? Or was a canoe blown out of its course in some inter-island voyage? We will never know. But their landfall on the only islands in the vast north Pacific seems little short of miraculous. For some centuries after the settlement voyages were made back and forth between the old home and the new. Without the compass, in frail outrigger canoes, we cannot but admire the seamanship of a people willing to undertake that 2300 mile voyage.

With them the colonists brought the dog, pig, and fowl; also taro, cane, the banana, and perhaps the coconut. They were not cannibals, though sometimes captives of war were sacrificed to the Gods. Kamahameha I, of whom a fine statue stands before the Judiciary Building in Honolulu, was the first king controlling the entire group. In 1795, he defeated the Oahuans, driving their army up Nuuanu Valley and over the Pali, a 700 foot drop.

Hawaiians are still excellent boatmen, but while they work on cattle ranches and the like, they do not care for field and mill labor. In the industrial development of the islands, Japanese labor is almost exclusively used.

For the sessions relating to volcanos the Scientific Conference adjourned to the island of Hawaii. Here on the summit of Kilauea vulcanology was discussed by the masters of America and Japan, Jaggar, Omori, and others, illustrated by an active crater. Professor Jaggar, Director of the Volcano Observatory, has had Kilauea under daily observation for over ten years. The work begins a new era in the study of volcanos. To see Halemaumau, "the house of eternal fire", at night is one of the unforgettable sights of a lifetime. Black crags jut out of the fiery lake. Lava fountains give rise to rivers which stream to vortices where the

cakes of crusted lava tilt up and disappear, with din of lava surf breaking on the crags. At half hour periods all activity is intensified.

Where there have been no recent lava flows, the upper slopes of the volcano are richly clothed with forest. The trunks are covered with wet moss, giving roothold to ferns and flowering plants. The curious birdnest fern lodges in the branches. Further up there is fine tree fern jungle, followed by scarlet flowered lehua forest and in places great koa<sup>2</sup> trees.

Along the margin of the outer crater of Kilauea we noted one of the few northern hemisphere plants recognizable in the bewildering botany of Hawaii. It is the Ohelo, a huckleberry, much larger than ours, red, and fruiting in wonderful profusion. It was tabu in the old days, being sacred to Pele, the volcano goddess. It is very palatable, and makes a pie to be remembered with affection.

Among the greatest attractions of Hawaii is the hospitality of her delightful people. Perhaps it has limits, but we could find none. And it may be suspected that the resolve of each one of us to revisit Hawaii was really as much to enjoy again the friends we have made as to work on the scientific problems of the islands.

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## A TRIP TO THE SANTA MARTA REGION OF COLOMBIA.

BY JAMES A. G. REHN.

If one looks at a relief map of the Republic of Colombia there will be seen in the western and west-central portion, the principal mountains of the country running in three roughly parallel north-east and south-west series. They will notice that the series or ranges come together in the south in what the geographers call "The Pasco Knot;" also that the valleys between the three ranges are occupied by the Magdalena River and its main affluent, the Cauca River. The three large divisions of the Colombian Andes are called the "Cordillera Occidental," "Cordillera Central," and the "Cordillera Oriental."

To the north the first two of these cordilleras die out before they reach the region of the Caribbean Sea, but the eastern or "Orien-

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<sup>2</sup> A species of *Acacia*.

tal," it will be noticed, extends off to the northeast, and apparently disappears in a peninsula extending into the Caribbean, the Goajira Peninsula, named after its but slightly civilized and war-like native inhabitants. Just to the east of the mouth of the great Magdalena river will be seen on the map a high group of mountains, apparently not connected with the Cordillera Oriental, near which they are placed, and coming down very sharply to the sea. These are the Sierra Nevada de Santa Marta, reaching an elevation of over seventeen thousand feet and the highest slopes of which are perpetually snow covered, like the higher Andes. Separated from the eastern Andes, the Sierra Nevada, as the name is generally shortened, is an island mountain mass, with a different geological history and some marked differences in its animal life from the chains of the Andes.

The animal life of this region has been investigated by a number of workers, usually interested in some special field of study, but outside of the vertebrate forms of life no more than a preliminary survey has been made. The work of a resident American zoologist, Mr. M. A. Carriker, Jr., and his encouragement and assistance to visiting student friends, have been very largely responsible for bringing to light many of the interesting things which have been discovered in the Santa Marta region.

Late in June, 1920, the steamer "Santa Marta" of the United Fruit Company left New York bound for Santa Marta, and among its passengers were Mr. James A. G. Rehn, Assistant Curator of the Academy, Mr. Morgan Hebard, Research Associate, and Mr. Frank R. Mason, a member of this institution. Their purpose in going to Colombia was to study and secure collections of Orthoptera, Coleoptera, and other insects from representative localities in and near the Sierra Nevada de Santa Marta. Calls at Kingston, Jamaica, Cristobal, Canal Zone, and Cartagena and Puerto Colombia, Colombia, ranging from one to three days, permitted some work to be done at each of these points.

The opportunities to work at Cartagena and Puerto Colombia were particularly valuable to us, as thereby important comparative material was secured and studies made, both of these localities being in the arid Caribbean Faunal Area. Here cacti, aloes, thorn-bearing and mimosa-like bushes and trees, and other plants, lovers of dry soils, largely made up a dense scrub, which was still in part leafless on account of the delayed onset of the rainy season.

Cartagena itself is quaint and Old World like, its churches and old walls, which caused Philip II so much concern and expense, show that the city dates back to 1553, while its streets suggest those of Cadiz, withal surprisingly clean and neat. Puerto Colombia is a small community clustered about the shore end of the iron pier of the Barranquilla railroad, a town whose existence is solely due to the dangerous bar at the mouth of the Magdalena River which prevents sea-going vessels reaching Barranquilla, the main port of the Republic. Thus, the imports and exports of a large part of the interior are left to the mercy of an antiquated, English controlled, narrow-gauge railroad, twenty odd miles in length. Puerto Colombia is anathema to most passengers bound for Santa Marta, as it may take as much as five days' time to unload and load cargo.

From the sea the Sierra Nevada de Santa Marta appeared first as a cloud-like mass hanging in the sky, and of such apparent height that it seemed incredible the mountains were before us. As the outlines sharpened and ridge beyond ridge were distinctly evident, the full magnitude of this mountain group forced itself upon one. We were not fortunate enough to be favored with a view of the snow summits from the sea, but our entrance into the beautiful harbor of Santa Marta will long be remembered.

The highest peaks of the Sierra Nevada de Santa Marta are virtually inaccessible from the north, and the upper slopes are best reached by circling the mountains and ascending from the Rio Cesar valley on the south. To the north of the high snow mountains is an outlying range of the system, which reaches an elevation of approximately 9000 feet, separated from the major portion of the mountains by gorge-like valleys with precipitous sides. This range is known as the San Lorenzo Mountains, after the highest of its peaks.

In the limited time at our disposal an effort to reach the higher snow mountains was virtually impossible, as well as undesirable from the standpoint of the work to be done. Our plan, as perfected after reaching Santa Marta, was to examine conditions about Santa Marta, in an arid environment much like that at Cartagena and Puerto Colombia; at a locality in the mountain forest; on the summit of the San Lorenzo range and in the heavy Magdalena type lowland forest to the west of the mountains. Thus we would be able to study and work typical localities of the Caribbean fauna and the Cauca-Magdalena fauna of the Tropical Zone, the Sub-

tropical Mountain Forest Zone and the Temperate Zone, as well as the peculiar semi-paramo conditions of the summit of San Lorenzo.

In the arid coast belt we worked at Bolivar, near Santa Marta, where we were the guests of Mr. Orlando L. Flye, the genial and hospitable Manager or "Gerente" of the Santa Marta Coffee Company. Here, at Hacienda Cincinnati and on San Lorenzo, we were assisted in every way possible by Mr. and Mrs. Flye, and other members of their family, as well as by Mr. Robert Sargent, the Superintendent of the Coffee Company at Hacienda Cincinnati. Their cordial and generous assistance remains one of the pleasantest memories of our Colombian work.

The vicinity of Bolivar differed from where we had worked at Puerto Colombia, as there was some land under irrigation, which brought in a greater diversification of insect life, although the delayed rains, a most important matter in the arid coast lands, had greatly retarded plant and insect development.

As a locality representative of the forest of the mountain slopes we studied the vicinity of Hacienda Cincinnati, a coffee plantation of the Santa Marta Coffee Company, situated on the western slope of the San Lorenzo range at an elevation of 4500 feet, and with large areas of uncut forest in the vicinity. On the way up the mule trail we passed from the coast region into one with stream course forest, and then into country originally, and yet in large part, solid forest. Here some weeks were spent and excursions made up to 6000 feet elevation, down to Minca at 2500 feet, and nearby forest tracts were regularly examined.

This mountain forest was very lofty, the low growth dense and tangled, the trees forming overhead a canopy which cut out much of the sunlight. Trees of the genus *Cecropia*, striking tropical American types, there called "guarumo" by the natives, were very important collecting places. Their large dead leaves, which hang or lodge suspended a long time, shed water admirably, and serve in the day time as sleeping or hiding places for cockroaches, crickets and katy-dids, occasionally sheltering a snake. A leptognathoid snake, known locally as a "mapaná," came vigorously to life out of a net full of guarumo leaves which was being examined.

In the mountain forest epiphytes or tree living plants were numerous, lianes and creeping plants abundant. Daily the cloud fog banks would sift into the forest about noon, and generally one or



more showers would fall in the afternoon. Moisture was everywhere in evidence, but from outlooks the coast land could be seen in the sunlight but twenty miles away,--rainless and parched. In the mountain forest and the coffee groves the bird life was most interesting; guans, turkey-like birds of the tropical American family Cracidae, called "pavos" or peacocks by the Colombians, several species of toucans, a relative of the ivory-billed woodpecker, parakeets, a number of species of humming-birds, weird woodhewers, wonderful *Euphonia*, *Calliste* and *Saltator* tanagers, black and white cotingas, a most home-like wren, and many other interesting types. A singularly beautiful voice of the forest was that of a very small frog, which in numbers called and answered in a most wonderful tinkling bell-like note, an invisible choir of chimes in the solemn mysteriousness of the forest twilight.

Every night at Hacienda Cincinnati several powerful gasoline pressure lights were burned to attract insects. Occasionally we carried our whole paraphernalia into the forest and erected our "moth tent" to give a white attracting surface. Much was also done at night with hand flash lamps, and many species secured in this fashion were not taken otherwise. The stretches of coffee trees themselves and open areas of heavy grass and patches of sugar cane all added their quotas to the collections made. Coffee is grown shaded by regularly planted guamo trees, which species is a relative of the mimosas and bears a huge pod, containing large beans which are occasionally eaten by the natives.

From Hacienda Cincinnati Mr. Flye has had a trail cut upward through the forest to near the summit of San Lorenzo, and over this trail, under the guidance of Mr. Robert Sargent, the genial Superintendent at Hacienda Cincinnati, we went for a three days' stay on the top of the San Lorenzo range. The forest remained much the same until an elevation of about 6000 feet was reached, when a gradual change became evident. The forest from this point became lower and more heavily tangled, large bromeliads became more evident, and, as we continued to ascend, the tree types changed considerably. Here the vegetation was much wetter than below, in fact water-soaked, with entangling vine bamboos; and giant tree ferns projected above the other members of the forest. Gnarled and twisted, but from twenty to thirty feet high and laden with bromeliads and mosses, these cloud-land forest trees had an unreal and spectral appearance. Over-topping all, the dominant feature



UPPER—LOOKING TOWARD SANTA MARTA FROM THE CINCINNATI TRAIL DOWN THE VALLEY OF THE MINCA RIVER.

LOWER—VICINITY OF HACIENDIA COFFEE PLANTATION. ELEVATION, 4500 FEET. COFFEE AT RIGHT AND IN FOREGROUND GROWING IN THE SHADE OF GUAMO TREES.









UPPER—TREE FERNS IN THE SUBTROPICAL MOUNTAIN FORESTS, AT 7000 FEET ELEVATION.

LOWER—LOOKING FROM THE SUMMIT OF SAN LORENZO MOUNTAINS, ELEVATION 8000 FEET, SOUTH-EAST OVER LARGELY UNMAPPED COUNTRY TO THE SNOW COVERED PEAKS OF THE SIERRA NEVADA DE SANTA MARTA, THE SUMMIT OF WHICH IS VARIOUSLY GIVEN AS 15452 TO 19000 FEET ABOVE SEALEVEL. TAKEN ABOUT SEVEN A. M., BEFORE THE GATHERING CLOUDS OBSCURED THE PEAKS.

of the upper forest, above which they stood like sentinels, were the wax palms—one of the handsomest of its group and one peculiar to the mountains of this portion of tropical America.

This region was a most interesting one to study, with much in it not encountered above or below, and a difficult type of country to examine on account of the tangled forest and its generally saturated condition, aside from the steepness of the slopes. The bromeliads alone yielded much of interest in the way of insects which, either habitually or occasionally, seek shelter between their leaves. Remarkable frogs, and even a species of salamander, live in the wet pockets at the leaf bases, specimens of these, as well as the eggs of the frog, having been secured by our party.

At an elevation of seventy-nine hundred feet the forest ceases and above this we have a virtually treeless bald, except for protected ravines, up which the timber creeps. Here we have a region covered waist to shoulder high with a dense tangle of bracken, thorny berry vines and low perennials, with many beautiful annuals, which suggested more temperate climes than Colombia. The dominant feature of the vegetation, however, was the great abundance of large ground bromeliads, to which we applied ourselves with a machete and enthusiasm. Previous information was to the effect that certain very desirable species of cockroaches (Blattidae) lived in these plants, and we secured not only greatly desired material of these, but also most valuable data on their immature stages, abundance of notes upon other insects living in these strange homes, and also upon the frogs with similar proclivities. Many other insects were taken and our gasoline lights, which had been most carefully transported to this out-of-the-way place, yielded a remarkable catch of moths on one of the nights spent there.

A few rods from our camp the mountain range broke off abruptly to the south, dropping down thousands of feet, in sheer cliffs, to the great valleys which separate the San Lorenzo range from the ridges which roll up to the grand culmination of the Sierra Nevada itself. Many times we looked for the snow peaks, while we were on San Lorenzo, but the cloud masses of the rainy season were jealous guardians and only quite early in the morning could one get a view of their superb grandeur. Then the indescribable magnificence of the trinity of snow-covered pyramids, with the light play of the rising sun upon them, would be revealed. Thirty miles away this wonderful group stood out serene and glorious, above a

chaos of lower ranges and ridges, each in itself a great mountain mass. Peering over the edge of San Lorenzo into nearly solid cloud banks below, we would see through a rift in the mist here a group of wax palms, another there, then the up-rush of the mist would swallow us and the whole mountain top. The cloud eclipse would last minutes or hours; and cold and wet, one would occasionally get a glimpse through a rift in the fog, far below us and off to the north, of the yellow glare of the hot and dry country about Santa Marta. When the clouds would leave the summit we could see, off to the westward, patches of the great lowland forest, tongues of which reach over from the middle Magdalena region, the last of the types of country we had planned to examine.

To reach this lowland forest we returned to Santa Marta and travelled over the Santa Marta Railway to Aracataca, fifty-five miles from Santa Marta, somewhat to the southwest of the Sierra Nevada itself and virtually due south of San Lorenzo, which from there dominated the view to the north. When conditions were favorable the snows of the Sierra Nevada were visible, and one day the setting sun turned these summits, over sixteen thousand feet above us, into cones of burnished silver.

Aracataca is a typical Colombian village, and here we were favored by being guests of the United Fruit Company, which controls the Santa Marta Railway and, at a number of points of which Aracataca is one, has extensive banana plantations. Much of the country about Aracataca itself has been cleared and is in bananas or used as pasture land, many of the wine palms or "palma de vino" of the original forest still dominating the landscape. The heavy forest, however, was but a few miles away, and for two weeks we worked steadily in this environment, the great lowland forest of ceiba bongo, ceiba blanca, macundo, palma de vino, palo sancta, platanillo, or wild banana, and numerous other trees. The great macundos and ceibas tower a hundred feet or more without a branch, their trunks like great columns of some old temple, their heads short, broad and relatively flat. The undergrowth is very dense and almost impenetrable in places, while a perpetual twilight exists in much of this vegetable paradise.

Great macaws screamed overhead in this forest, the howling monkeys roared in the distance, and the leaf-cutting ants were everywhere busily engaged in cutting leaves and transporting them underground to their chambers. Ants which stung and bit, ticks, mos-

quitoes, and other insect annoyances, were present in great variety, while the humidity was always high. In the life of the field naturalist, the abundance and persistence of insects which prey, and humidity which enervates, are serious matters.

The wealth of life, both animal and plant, in this great lowland forest appears inexhaustable, and steadily continued work accumulates wonderful collections; but constant application, with painstaking examination of first one, then another type of habitat, finally shows results in a marked reduction of previously unseen forms. This forest, however, was the richest piece of country, from the insect standpoint, examined by the expedition.

In the vicinity of Aracataca other pieces of forest, relatively dry in character, heavily matted jungle scrub and meadow land of rank grass were also studied, and yielded in their turn important collections. Iguana lizards scuttled about the wine palms in the compound of the United Fruit Company; and bats, which roosted in hundreds in the attic over our room, tried collecting the insects attracted to our gasoline lights on the veranda. The bats were discouraged by our collecting some of them, and our lights continued to be centers of insect attraction. From Aracataca we returned to Bolivar, packed our collections, and sailed for home in late August.

As a result of the expedition the Academy was enriched by a collection of seven thousand seven hundred specimens of insects, of which four thousand four hundred were representatives of the order Orthoptera, the chief object of the field work of Messrs. Rehn and Hebard, as well as a moderate-sized collection of reptiles and amphibians, and a few mollusks. The greatest result of the work, however, was the accumulation of quantities of original observations made in the field, in numerous cases on species regarding which no knowledge of their habitats and occurrence exists in scientific literature. This information can be secured only by trained observers, and collections made without such correlated observations fall, to a very considerable degree, short of the full usefulness which could be theirs. These notes will be utilized as the detailed study work on the collection progresses.

The Academy is under lasting obligations to Mr. Orlando L. Flye and Mr. M. A. Carriker, Jr., for their untiring kindness and courtesy and invaluable assistance, and also to their respective families for their cordial hospitality to its representatives. The United Fruit Company, through Mr. R. K. Thomas, Assistant

Manager at Santa Marta, and Señor Jesus Bermudez, Superintendent at Aracataca, assisted our party in every possible way, and by its generosity enabled us to carry on work in comfort, which under other conditions would have been much more difficult and far less satisfactory. His Excellency, Señor Don C. A. Urueta, the Minister of the Republic of Colombia at Washington, most kindly assisted in every way possible, and by his intercession secured free entry into Colombia of collecting materials used by our party.



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DAVID McCADDEN.

*Artist.*

HELEN WINCHESTER.

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\*Deceased March 14, 1921.

## Report of the Curators.

The exhibition halls of the Museum have been open free to the public throughout the year from 9 A. M. to 5 P. M. on week days, and from 1 to 5 P. M. on Sundays, and large numbers of visitors have availed themselves of the privilege of viewing the exhibits. The increase in the number of schools and classes accompanied by teachers, both from Philadelphia and nearby towns, has been very noticeable.

Additions have been made to many of the exhibits. Several valuable mammals presented by the Zoological Society of Philadelphia have been mounted, and several game heads and mounted fishes received from Miss Anne Thomson have been hung in the halls.

In the entrance hall the plan has been adopted of arranging on temporary exhibition collections or groups which will ultimately be placed in their respective departments. A group of muskrats showing a winter "lodge" or "muskrat-house" from the Delaware River marshes near Salem, N. J., procured for the Museum by Mr. Benjamin A. Carpenter; on it are several of the rats secured by Dr. Henry R. Wharton and the smaller rice rats which make their nests in the walls of the muskrat house. This is one of a series of groups of the local mammals of Pennsylvania and New Jersey which it is proposed to install. As a special exhibit two cases containing specimens of the more common mammals of the vicinity of Philadelphia have been arranged near by.

The collection of crabs and mollusks illustrating the life of the New Jersey coast marshes, presented recently by Dr. Witmer Stone, has been arranged in special cases in the entrance hall. Also a collection illustrating the rocks of the vicinity of Philadelphia and their stratigraphic relationship; and a collection illustrating the moulting of birds and the varied structure of bird plumage. These collections have attracted much attention, especially from school children.

During the spring months an exhibition of birds from the study



series was arranged, containing at first only the winter species, but with the spring migrants added at the dates on which they appear about Philadelphia, so that the collection contained the species that one would find in the vicinity of the city at any given time.

A similar series of pressed wild flowers from the herbarium was also on exhibition during the spring.

Through the coöperation of the Ludwick Institute provision has been made in the coming year for a department of Public Instruction, the head of which shall be a member of the Curators' staff. Besides taking over the management of the lecture courses, which are already conducted by the Ludwick Institute, he will prepare educational exhibits, and have a general supervision of the public exhibition collections. Important results are looked for from this department, which will bring the Museum into closer touch with the schools and the general public, and relieve members of the scientific staff from duties that did not properly pertain to their work.

While the museum staff has been constantly engaged in the study of material in the various departments, much valuable field work has also been accomplished. Mr. J. A. G. Rehn was sent to Santa Marta, Colombia, coöperating with Mr. Morgan Hebard, Research Associate in the Department of Entomology, and Mr. Frank Mason, a member, who had organized a trip to this region. Large numbers of insects were obtained, the collection of Orthoptera being of chief interest, although series of Lepidoptera and Coleoptera of almost equal extent were secured, as well as a valuable series of reptiles.

Dr. Henry A. Pilsbry attended the Pan-Pacific Conference at Honolulu as the Academy's delegate, and was able to obtain a valuable collection of Hawaiian Mollusca supplementing that obtained by him in 1913.

Dr. Henry Skinner made a trip to the vicinity of Glenwood Springs, Colorado, from there to the Sierra La Sal, in Utah, stopping at several other points on his return, and has presented the Academy with the valuable series of insects secured.

Local collections of interesting plants and birds were made by Dr. Stone at Cape May, N. J.; of plants from various nearby localities by Mr. Bayard Long; and of fishes and reptiles by Mr. H. W. Fowler; while Mr. Samuel G. Gordon has made important geological studies along the southern tier of counties in Pennsylvania

and obtained a large number of valuable additions to the mineralogical collections.

Details of work in the several departments and accessions for the year follow:

#### MAMMALS.

Many specimens have been received from the Zoological Society of Philadelphia which have been variously prepared as skins, skeletons, or mounts. An important collection of game heads was received from Miss Anne Thomson, formerly the property of her brother the late Frank Thomson. Certain of the Californian jumping mice in the collection have been studied during the year by Dr. Joseph Grinnell; and the entire series of western chipmunks has been loaned to the U. S. Biological Survey for study in connection with Mr. Howell's monograph of this group.

#### BIRDS.

A fine series of birds and eggs collected at St. Marks, Florida, by Mr. C. J. Pennock was purchased during the year, and many specimens presented by the Zoological Society of Philadelphia were prepared as skins or osteological specimens. The valuable collection of East African birds obtained by Mr. Geo. L. Harrison, Jr., in 1903, and which had been deposited in the Academy, has been generously presented by him. A valuable series of eggs and nests of Pennsylvania birds was received in exchange from Mr. R. C. Harlow.

The entire series of bird skins was carefully examined during the year and found to be in excellent condition. The collection of eggs was entirely rearranged and several families of birds critically studied. A unique collection of local birds, beautifully mounted on hard wood bodies in glass covered boxes was presented by Mr. Edward Mattern. This it is proposed to complete and use for the exhibit of bird life which has been a feature of the Museum in the past two seasons, during the period of spring migration.

The Curator has received from Princeton University the remainder of the birds obtained on the Patagonian Expedition and has been engaged in completing the report on this collection for the series being published by that University.

Messrs. W. L. Sclater, of London; W. B. Alexander of Western Australia; Mr. A. Haagner of South Africa have visited the department during the year; and many American ornithologists have made use of the collections.

#### REPTILES AND FISHES.

Mr. H. W. Fowler in charge of these collections has cared for the numerous accessions received during the year, and has determined and labelled most of them.

An extensive report on the fishes of the U. S. (Wilkes) Exploring Expedition to be published by the U. S. National Museum was completed during the year, and a paper on local fishes obtained during 1919 was published in the PROCEEDINGS of the Academy.

Local collecting trips were taken during the year to various points in Pennsylvania, Delaware and Maryland.

#### MOLLUSCA.

The collection of Mollusca has received numerous important accessions largely from material sent for study and identification to the Curator, Dr. H. A. Pilsbry, from which the Academy has been given duplicate series. Among the most important collections are those from South Africa, from H. C. Burnup; from the Belgian Congo, from the American Museum of Natural History; and many lots from various parts of the United States, especially the J. H. Ferriss collection from northern Arizona, the J. B. Clark collection from Florida, Delaware, etc. The preparation of the Pupillidae for the "Manual of Conchology" has been continued during the year by Dr. Pilsbry, the subfamily *Vertigininae* being completed; various papers on the shells of Central America, Hawaii, and Haiti, have been published by him, and by Mr. E. G. Vanatta.

#### INSECTS.

Dr. Henry Skinner, head of the Department of Insects, reports that nearly 19,000 specimens have been added to the collections during the year. Practically all of his time has been taken up with the care and determination of the accessions of Lepidoptera, and in preparing reports on certain of the collections, besides important field work accomplished in the Sierra La Sal, Utah.

In the Hymenoptera, Mr. E. T. Cresson, Jr., has completed the determination and marking of the types. In the Diptera he has

completed a revision of the Sciomyzidae and rearranged certain other families, while he also made a study of the Loew types in the Museum of Comparative Zoölogy. One of the most important accessions of the year was the Harbeck collection of Diptera, purchased by the Academy, comprising 9,300 specimens and 1,579 named species making the collection of North American flies very complete. Mr. Rehn and Mr. Hebard have devoted all of their time, except the summer months when they were in South America, to the study and arrangement of the Orthoptera. Mr. Hebard has added to his collection, on deposit at the Academy, the Hancock collection of Tettigidae, the most representative in the world.

Mr. Rehn has completed a study of the Dermaptera of the American Museum Congo Expedition; and a study of the Blattidae in the Transvaal Museum collection is nearly completed. From both, the Academy receives a representative series of duplicates.

Mr. Hebard in the course of his studies has determined South American collections of Blattidae, etc., from the Paris Museum, and has continued his monograph of the North American Melanopli.

#### HERBARIUM.

The rearrangement of the Herbarium in the new room has progressed, as far as cases are available, under the direction of Mr. Stewardson Brown, in charge of the Department, the remainder of the general series being accommodated in a room at the S. W. corner of the building, where duplicates and portions of the Porter collection are stored.

The greater part of Mr. Brown's time has been occupied in determining the Arizona Collection made last year by Dr. Witmer Stone, and in preparing for mounting a valuable collection of British Colombian and Alaskan plants presented by Mr. Adolph Müller. Portions of the Canadian material received by purchase early in the year have also been mounted, as well as other large accessions. Mr. Bayard Long has continued in charge of the local collections and has studied critically a number of groups, besides securing many additional specimens on collecting trips in local territory. There has now accumulated a large amount of such material which is awaiting mounting before it can be placed in the regular series.

## MINERALS.

During the past year the concentration of the mineral and rock collections in the new quarters was completed. The collection of the Second Geological Survey of Pennsylvania was brought up from the basement and placed on the first floor, where the specimens are readily accessible, while the rock collection was removed to the second floor. A room in the basement has been assigned for the storage of the First Geological Survey collection, the duplicates of the Second Survey, and the Woolman collection of New Jersey well records.

A small hand lap has been installed for grinding thin sections.

Among the more important accessions of the year were specimens of the Mt. Joy and Cumberland Falls meteorites, and a collection of American rocks, which were obtained from the U. S. National Museum by exchange; and a collection of stalactities and stalagmites from the Redington cave, Northampton County, Pennsylvania.

During the spring, Mr. Gordon spent three weeks studying the chromite deposits and albite pegmatites of southern Pennsylvania and Cecil County, Maryland. During the summer a collecting trip was taken through Virginia, the itinerary including the Amelia mica mines, Irish Creek tin mines, and the Midvale, Rockbridge County, durrenite locality. The rest of the summer was spent in visiting localities in Pennsylvania; and in studying the Ordovician diabases and basalts of Lebanon County.

## ARCHAEOLOGY.

Miss H. Newell Wardle, in charge of this department, reports that the Archaeological and Ethnological collections, having now reached the limits of congestion, no further additions can be made to the general exhibit\* until new cases are procured. Two small cases in the adjoining room, having been placed at the service of the department, have been devoted to the temporary display of recent additions to the collection and special exhibits of specimens, hitherto stored. It is designed to change their contents periodically.

Progress has been made in the sorting, cataloging, and care of the Gottschall collection of North American Indian material.

Mr. Clarence B. Moore was again compelled to forgo his usual autumn expedition to the southern states. His spring expedition to the Florida west coast and keys resulted in the discovery of new types of aboriginal shell-implements.

## REPORT OF THE CURATOR OF THE WILLIAM S. VAUX COLLECTIONS.

Mr. F. J. Keeley, Curator of the William S. Vaux collections, reports that the more important accessions during past year, include four specimens of meteorites obtained by exchange with the United States National Museum, and one purchased.

The following mineral specimens were presented: magnetite, French Creek Mines, Pa.; actinolite, Pleasant Grove, Penna.; colerainite, Brinton's Quarry, and Sylmar, Pa.; andradite, Cornwall, Pa.; pyrite and pyrrhotite, French Creek Mines, Pa.; microcline and albite, Amelia, Va. The first named was the gift of Frederick Oldach; the others from Samuel G. Gordon.

Forty-nine specimens of minerals were purchased, including an interesting series of corundums from Unionville, Pa.

As in previous years, specimens received have been labelled and placed in the collection by Mr. Samuel G. Gordon.



## ADDITIONS TO THE MUSEUM.

1920.

## MAMMALS.

MRS. ELIZABETH H. BENSON, in memory of Charles Hamilton Benson.—Skin of Grizzly Bear (*Ursus horribilis*), and six pairs of mounted horns.

MRS. M. C. BOOTH. Mole (*Scalopus aquaticus*) from Haverford, Pennsylvania.

HAMPTON L. CARSON. Mounted head of abnormal Prong-horn Antelope (*Antilocapra americana*) and skull of Mountain Goat (*Oreamnos montanus*).

MISS SARAH CROSSETT. Mounted Wild Cat (*Lynx ruffus*).

WHARTON HUBER. Skeleton of Mearns' Coyote (*Canis mearnsii*).

W. L. KAHLEN. Skin of Mountain Goat (*Oreamnos montanus*).

ZOOLOGICAL SOCIETY OF PHILADELPHIA. Specimens prepared as follows:—Skin and skull: male Black Buck (*Antelope cervicapra*), Purple-faced Monkey (*Pygothrix cephaloptera*). South African Ground Squirrel (*Xerus capensis*), Squirrel Monkey (*Saimari sciureus*), Tamandua Anteater (*Tamandua tetradactyla*). Skin and skeleton: male Chacma Baboon (*Papio porcarius*), and male Urial (*Ovis vignei*). Skeletons: female Leche Waterbuck (*Kobus lechi*), Llama (*Llama glauca*). Skulls: Black-striped Wallaby (*Macropus ruficollis*), Nail-tailed Kangaroo (*Onychogale unguifera australis*), Timber Wolf (*Canis occidentalis*), Bles-bok (*Damaliscus albifrons*) and Short-tailed Wallaby (*Macropus brachyurus*).

## BIRDS.

CHARLES W. BECK. White Swan (*Cygnus olor*) picked up on the ice at Beach Haven, New Jersey.

MISS SARAH CROSSETT. Seven mounted Birds.

LAWRENCE FARRELL. Great Horned Owl (*Bubo virginianus*).

GEORGE L. HARRISON, JR. Collection of African Birds on deposit for some years past.

DR. WILLIAM E. HUGHES. Collection of Peruvian Bird-skins.

EDWIN S. MATTERN. Collection of mounted Birds from Pennsylvania, North Carolina, South Carolina, and Florida.

DR. MCKAY. Mounted Great Horned Owl (*Bubo virginianus*), and Screech Owl (*Otus asio*).

H. C. PIERSON. Skin of young Great Horned Owl from Chester County, Pennsylvania.

DR. R. W. SHUFELDT. Skeleton of Grebe (*Tachybaptus philippinensis*).

DR. HENRY SKINNER. Skin of Silver Pheasant (*Gennaesus nycthemerus*).

JOHN C. TRAUTWINE. Mounted Resplendant Trogon (*Pharomacrus mocino*), from Honduras.

DR. SPENCER TROTTER. Skull of Kittiwake Gull (*Rissa tridactyla*) from Nova Scotia.

ZOOLOGICAL SOCIETY OF PHILADELPHIA. Hyacinthine Macaw (*Anodorhynchus hyacinthus*) twenty-six years and seven months in the Gardens. Skins of Swainson's Francolin (*Pterinistes swainsoni*), Pennant's Parrakeett (*Platycercus elegans*) and Ouzel Skin, and skeleton of Rhea (*Rhea americana*). Skeleton: male South African Ostrich (*Struthio australis*).

R. C. HARLOW, in exchange, series of eggs of Pennsylvania birds.

#### REPTILES AND AMPHIBIANS.

DR. HOUSEMAN. Nine jars of Snakes, found on logwood steamers at Philadelphia.

BAYARD LONG. Collection of Amphibians and Reptiles from Nova Scotia.

MUSEUM OF COMPARATIVE ZOOLOGY, in exchange, *Rana grylio* and *Pseudotriton montanus*.

HERBERT J. PACK. Collection of Reptiles from Utah.

DR. R. W. SHUFELDT. Southern Tree-frog.

#### FISHES.

RICHARD M. ABBOTT. Harvest Fish (*Seserinus paru*) from Rhodes River, Maryland.

RICHARD M. ABBOTT and HENRY W. FOWLER. Two Fishes from Rhodes River, Maryland.

W. O. ABBOTT. Bottle of Fishes from Wood's Hole, Massachusetts.

ED. CORUMAN. Black Drum (*Pogonias cromis*) from New Jersey.

MORGAN HEBARD. Two jars of Fishes from Florida.

HOWARD R. HILL. Ten Fishes from Pensacola, Florida.

PROF. CHARLES LA WALL. Two Grunts (*Orthopristis chrysopterus*) from New Jersey.

H. L. MATHER and HENRY W. FOWLER. Jar of Fishes from Maryland.

MASAMITSU OSHIMA. Jar of types of Formosan Cyprinoids.

HERBERT J. PACK. Collection of Fishes from Utah.

H. L. THOMPSON, LEWIS DORSEY and HENRY W. FOWLER. Five bottles of Fishes from Lower Delaware.

UNITED STATES NATIONAL MUSEUM. Twenty-nine Macrurids.

DR. R. O. VAN DEUSEN. Harvest Fish (*Seserinus paru*) from Fortescue, New Jersey.

#### RECENT MOLLUSCA.

R. M. ABBOTT. One tray of young *Ampullaria* from Trinidad.

DR. W. L. ABBOTT. Seventeen trays of land and fresh water shells from Pennsylvania and the island of Hayti.

W. O. ABBOTT. Seventeen trays of aquatic shells from Massachusetts and New Jersey.

JACOB AEBLY. Four species of marine shells taken from a duck.

M. ALLEN. Four species of marine shells.

REGINALD ALLEN. *Conus vexillum* Mart.

AMERICAN MUSEUM OF NATURAL HISTORY. One hundred and eighty-eight trays of land shells from the Belgian Congo.

E. ASHBY. Forty-three trays of marine shells from Australia.

F. C. BAKER. Ten trays of fresh water shells from northern United States.

E. B. BARTRAM. Eight species of land and marine shells from Arizona and California.

DR. PAUL BARTSCH. *Blanfordia formosana* Pils. from Taichu Province, Formosa.

DR. J. BEQUAERT. Seven species of African land shells.

S. S. BERRY. Nine species of shells from western North America.

BERNICE PAUAI BISHOP MUSEUM. Twenty trays of land shells from the Hawaiian Islands.

PROF. J. CHESTER BRADLEY. Three land shells from Georgia.

LOUIS H. BREGY. Forty trays of land and marine shells from Utah and Cuba.

ALBERT E. BROOKES. *Plaxiphora coelata* Rve. from Doubtless Bay, New Zealand.

W. A. BRYAN. Three hundred and fifty-six trays of Hawaiian marine shells.

MRS. H. H. BUCKMAN. Six species of land shells from Clyde, North Carolina.

H. C. BURNUP. One hundred and thirty trays of African shells.

FRED L. BUTTON. *Vertigo ovata* Say from Seattle, Washington.

GEO. H. CLAPP. Nine trays of land and fresh water shells.

W. F. CLAPP. *Planorbis parvus* Say from Lexington, Massachusetts.

JAMES B. CLARK. Two hundred and seven trays of shells from Eastern United States.

T. D. A. COCKERELL. Five trays of land shells from Colorado.

ALFRED M. COLLINS. Two marine shells from Africa.

M. CONNOLLY. *Nesopupa g. rhodesiana* Pils. from Rhodesia.

PROF. F. CONTREROS. Eleven trays of Mexican fresh water shells.

W. J. CRESSON Jr. Three species of land shells from Pennsylvania.

PROF. PH. DAUTZENBERG. Two species of Chitons from France.

J. H. FERRISS. One hundred and eighty trays of West American land shells.

H. W. FOWLER. *Segmentina jenkinsii* Cpr. from Piermont, New York.

JULIA GARDNER. Six species of land shells from Jamaica.

CALVIN GOODRICH. Thirty-four trays of fresh water shells from central United States.

MORGAN HEBARD. Nine trays of American shells.

JOHN B. HENDERSON. Eleven trays of Cuban land shells.

JUNIUS HENDERSON. *Pupoides hordaceus* Gabb from St. Miguel County, Colorado.

A. A. HINKLEY. Eighty-nine trays of shells from Central America and Mexico.

A. HINKLEY and J. FERRISS. Four land shells from Arizona.

C. W. JOHNSON. Nine marine shells from Florida.

F. J. KEELEY. Eggs of *Ampullaria depressa* Say from Hawks Park, Florida.

BAYARD LONG. Seventy trays of shells from Nova Scotia and eastern United States.

BRUCE MARTIN. *Epiphragmophora t. cypreophila* Nc. from Fresno, California.

DAVID McCADDEN. Two species of Naiades from Delaware.

REV. H. E. MEYER. Eight exotic shells.

- CLARENCE B. MOORE. Eighty-one trays of land shells from Florida.  
 DR. J. P. MOORE. *Oreohelix strigosa* var. from Utah.  
 W. M. MUNRO. Sixteen trays of shells from Texas.  
 MRS. IDA S. OLDROYD. Seventy-eight trays of West American shells.  
 A. A. OLSEN. Four land shells from Panama.  
 J. M. OSTERGAARD. Twelve trays of marine shells from Territory of Hawaii.  
 J. H. PAINE. *Ancylus* from California.  
 HERBERT J. PECK. Three fresh water shells from Utah.  
 H. A. PILSBRY. One hundred and thirty-two trays of shells from Hawaiian Islands.  
 PURCHASED. Two hundred and twenty-four trays of exotic shells.  
 CHARLES RAMSDEN. Thirteen trays of Cuban shells.  
 J. A. G. REHN and M. HEBARD. Thirty-six trays of land shells from North and South America.  
 JOSEPH ROSENFELT. One pearl from *Ostrea elongata* Sol.  
 M. SEAMAN. Nine species of marine shells from Liberia.  
 DR. HENRY SKINNER. *Oreohelix h. betheli* P. and C. from Glenwood Springs, Colorado.  
 BURNETT SMITH. Seventeen trays of fresh water shells from New York.  
 H. H. SMITH. *Polita carolinensis* Ckll. from near Stevenson, Alabama.  
 MAXWELL SMITH. Two species of shells from Arkansas and Arabia.  
 IRWIN SPALDING. *Achatinella elegans* Nc. from Hauula, Oahu.  
 E. T. STUART. Seven trays of marine shells.  
 D. THAANUM. Seventy-one trays of land and marine shells from Territory of Hawaii and Japan.  
 D. THAANUM and D. LANGFORD. Eight trays of Hawaiian marine shells.  
 L. A. THURSTON. *Viviparus georgianus* Lea, from West of Daytona, Florida.  
 UNIVERSITY OF MICHIGAN, in exchange. *Oreohelix i. baileyi* Bartsch from Snake River Canyon, Idaho.  
 E. G. VANATTA. *Ovula ovulum* L.  
 DR. BRYANT WALKER. Five trays of shells from Guatemala and Michigan.  
 M. L. WINSLOW. Ten trays of *Succinea* from North Dakota.  
 MRS. C. W. WOODWARD. *Megalatractus aruanus* L.  
 JAMES ZETEK. Eleven trays of land shells from Panama and the Canal Zone.

## INSECTS.

- W. L. ABBOTT. Fifteen Lepidoptera, two Coleoptera, Haiti.  
 ACADEMY COLOMBIAN EXPEDITION. Two thousand two hundred and thirty-five Orthoptera and three thousand two hundred and two other insects.  
 C. P. ALEXANDER. Twenty-two Craneflies, Japan.  
 E. B. BARTRAM. Nine insects from Arizona.  
 WILLIAM BEUTENMULLER. Thirty-seven *Cychnus*, North Carolina.  
 E. H. BLACKMORE. Four butterflies. Vancouver.  
 J. G. BONNIWELL. Two moths from Texas and two from New Mexico.  
 ANNETTE F. BRAUN. Twenty-four Microlepidoptera, United States.  
 P. P. CALVERT. Two *Aedes*. One Ascalaphid, Ecuador. Fifteen Lepidoptera, Costa Rica. Two slides of Mallophaga, Pennsylvania.  
 T. D. A. COCKERELL. *Furcaspis biformis*, Colorado.

- W. P. COMSTOCK. Three butterflies, Utah and California.
- W. J. COXEY. Two *Attacus aurantiaca* Ke Island. *Payilio toboroi*, New Guinea. Forty butterflies, Madagascar.
- JOHN J. DAVIS. Eighteen *Lachnosterna*, United States.
- W. T. DAVIS. Two *Okanagana magnifica*, New Mexico.
- C. L. FOX. Seventeen *Argynnis*, California.
- C. W. FROST. Dragonfly, Haverford, Penna. Beetle, Phila. Penna.
- FRANK HAIMBACH. Two moths, Colorado and Mexico.
- D. E. HARROWER. Thirteen specimens of *Thecla*.
- HAWAIIAN SUGAR PLANTERS' ASSOCIATION. Two mole crickets (*Gryllotalpa*).
- HEBARD-ACADEMY EXPEDITION, 1919. One hundred and fifty Coleoptera, sixteen Diptera, fifteen Odonata, one hundred Lepidoptera. Western U. S.
- MORGAN HEBARD. Eighty Lepidoptera, Virginia. One hundred and eight Lepidoptera, Michigan. One hundred and one Lepidoptera, Georgia. Twenty-five Orthoptera, Arizona. Seven hundred and fifty Hymenoptera, United States. Twenty-four Hemiptera, California. Thirty Diptera, Western U. S. Two hundred and ninety-five Hemiptera, United States. Fifteen Neuroptera, United States. Four insects, Africa.
- H. HORNIG. Forty Culicidae. Pennsylvania.
- DR. HOUSEMAN. Eight bottles of insects, found on logwood steamers at Philadelphia.
- W. E. HUGHES. Seven Cicada, South America.
- J. C. HUGUENIN. Three butterflies, California.
- C. W. JOHNSON. Sixteen Anthomyidae, United States.
- PHILIP LAURENT. Ten Diptera, Florida. Four Lepidoptera, Pennsylvania.
- R. A. LEUSSLER. Two *Euphydras bernadetta*, Nebraska. Nine Rhopalocera, Nebraska.
- FRANK R. MASON. One hymenopteron, U. S.
- PURCHASED. Five hundred and fifty-five Orthoptera, Madagascar. Forty-one moths, Arizona. Two hundred and twenty-six Hesperidae, Colombia.
- PENNSYLVANIA DIVISION OF PLANT INDUSTRY. Seven Orthoptera from Pennsylvania and Arizona.
- C. T. RAMSDEN. Five Hesperidae, Cuba.
- L. P. ROCKWOOD. Twenty-six Orthoptera from the Northwestern United States.
- WILLIAM SCHAUS. Seventy-two moths, Central America. One hundred and forty moths, Guatemala. Fifteen Rhopalocera, Mexico and Central America.
- J. W. SCHELL. Japanese mantis (*Tenodera sinensis*).
- HENRY SKINNER. One hundred and eighty-two Lepidoptera. One hundred and nineteen Orthoptera. Sixty Diptera. Thirty-four Coleoptera. Eleven Hymenoptera, Sierra La Sal, Utah.
- STATE ENTOMOLOGIST OF NEW YORK. Two specimens of *Anisolabis maritima* from New York.
- O. A. STEVENS. Eleven Insects, North Dakota.
- WITMER STONE. Four *Colias*, New Jersey.
- R. J. TILLYARD. Three Micropterygidae, Four Neuroptera, New Zealand.
- U. S. NATIONAL MUSEUM. Three Cynipidae.



UNIVERSITY OF MICHIGAN MUSEUM. Two hundred and forty-one Orthoptera from Texas, Oklahoma, Michigan, and Illinois.

R. C. WILLIAMS, JR. Twenty one slides of *Lycaena* genitalia.

#### OTHER INVERTEBRATES.

C. M. BARBEAU. One tray of *Balanus* from British Columbia.

DR. S. S. BERRY. *Lepas fascicularis* from Oceanside, California.

W. A. BRYAN. One tray of *Terebratula* from the Hawaiian Islands.

CANADA GEOLOGICAL SURVEY. Twenty-five trays of barnacles from British Columbia.

R. CHAMBERLAIN. Four paratypes of *Neoscena salaeria*.

MORGAN HEBARD. Several invertebrates from Florida.

HEBARD-ACADEMY EXPEDITION, 1919. Three scorpions from Arizona and New Mexico.

DR. HOUSEMAN. Four jars of spiders and scorpions found in logwood steamers at Philadelphia.

PHILIP LAURENT. *Gordius* from Gunntown, Florida.

MRS. IDA S. OLDROYD. Eight trays of invertebrates from West America.

H. A. PILSBRY. Nine trays of Hawaiian invertebrates.

S. RAYMOND ROBERTS. *Balanus crenatus* Brug. from Vineyard Haven, Massachusetts.

STANFORD UNIVERSITY. *Chelonobia testudinaria* from Galapagos Islands.

WITMER STONE. One tray of *Lepas* from Cape May, New Jersey.

UNITED STATES FISH COMMISSION. Two New England barnacles.

UNITED STATES NATIONAL MUSEUM. Fourteen trays of barnacles from Western America.

MRS. JAMES F. WOOD. *Moiria atropos* Kl. from Boca Grande, Florida.

JAMES ZETEK. *Megalasma subcarinatum* Pils. from Pacific Ocean cable.

#### FOSSIL INVERTEBRATES.

JAMES B. CLARK. Four trays of Pliocene shells from Florida.

W. M. MUNRO. *Exogyra arietina* Roem., from near Austin, Texas.

LYOYD B. SMITH. One *Naticopsis* from Texas.

#### MINERALS.

MORRELL BIERNBAUM. Chabazite and actinolite, Pennsylvania.

SAMUEL G. GORDON. Fifty-four Pennsylvania minerals, including a collection of stalactites and stalagmites from the Redington Cave.

HUGH ALEX. FORD. Thomsonite, Lenni, Penna.

F. LYNWOOD GARRISON. Chromite, Line Pit, Lancaster County.

JOHN FRANKENFIELD. Pyrrhotite, and Magnesite, Pennsylvania.

A. C. HAWKINS. Deweylite, Elam, Pennsylvania.

CALIFORNIA MINING CO. Wulfenite, Arizona.

LEHIGH UNIVERSITY, in exchange, Wavellite and axinite, Pennsylvania.

LEVI MENGEL. Natrolite, Birdsboro, Pennsylvania.

BENTLEY R. MORRISON. Apophyllite, French Creek mines, Chester County, Pennsylvania.



FREDERICK OLDACH. Magnetite, French Creek mines; and erythrite and arsenopyrite, Gickerville, Berks County, Pennsylvania.

HUGO ROTHSTEIN. Roscoelite, and carnotite, Vanadium, Colorado.

HENRY A. PILSBRY. Sulphur, Hawaii.

HARRY A. WARFORD. Prehnite, Lenni, Pennsylvania.

H. L. WILLIG. Amethyst, Lancaster County, Pennsylvania.

EDGAR T. WHERRY. Allanite, and chloropal, Berks County, Pennsylvania.

#### ROCKS.

SAMUEL G. GORDON. Collection of rocks from the chromite deposits and albite pegmatites of southern Pennsylvania and Cecil County, Maryland. Collection of diabases and basalts of Lebanon County, Pennsylvania.

HENRY A. PILSBRY. Basalt scoria, and olivine basalt, Hawaii.

U. S. NATIONAL MUSEUM, in exchange. Collection of American rocks. Mt. Joy, Adams County, Pennsylvania, meteoric iron. Cumberland Falls, Ky., meteoric stone.

#### PLANTS.

H. G. ALLEBACH. Several specimens from Berks County, Pennsylvania.

E. B. BARTRAM. Eighty-five Arizona plants.

G. W. BASSETT. Plants from Long Island, *Tipularia*.

WALTER BENNER. Collections from Eastern Pennsylvania.

REV. T. R. BRENDLE. Collection from Fortesque New Jersey, and the Perkiomen Valley, Pennsylvania.

O. H. BROWN. Several collections from Cape May County, New Jersey.

T. FRANKLIN COLLINS. Portion of type lot of *Polygonum Pennsylvanicum* var. *mesophilum* Fernald, Block Island, Rhode Island.

DR. C. D. FRETZ. *Oxalis corniculata*, Sellersville, Pennsylvania.

MRS. L. S. GALE. *Cornus florida*, Tuckerton, New Jersey.

GRAY HERBARIUM. Four specimens of *Cerastium* from Newfoundland and Labrador.

W. S. HAMMOND. Collection from Oregon formed by E. W. Hammond.

RALPH HOFFMAN. Several *Eragrostis* from Berkshire County, Massachusetts.

A. N. LEEDS. *Prunus cuneata*, Serpentine Barrens, Chester County, Pennsylvania.

B. LONG. Numerous Pennsylvania and New Jersey plants.

DR. H. B. MEREDITH. Sixty-five local plants, *Crepis biennis*, Dunville, Pennsylvania.

ALEXANDER MACELWEE. Five hundred plants from Pennsylvania, New Jersey and West Virginia.

J. C. NELSON. *Alopecurus geniculatus*, Oregon.

ADOLPH MÜLLER. Four-hundred plants from British Columbia and Yukon Territory.

NEW YORK BOTANICAL GARDEN. One-hundred and sixty-seven plants in exchange.

H. A. PILSBRY. *Lycopodium* sp?, Oahu.

H. W. PRETZ. Four hundred plants chiefly from Lehigh County, Pennsylvania.

J. K. POTTER, *Juniperus communis* Seaside Park, New Jersey.

GEO. REDLES. Local specimens of *Lemna minor*, *Arctium lappa* and *Campanula americana*.

J. A. G. REHN and MORGAN HEBARD. Seven plants.

WITMER STONE. *Myrica carolinensis*, Cape May, New Jersey.

H. W. TRUDELL. *Crataegus* from Roan Mt., Tenn

UNIVERSITY OF PENNSYLVANIA. *Lophiola* from Mississippi.

T. B. WALTER. *Penstemon hirsutus* and *Convolvulus arvensis*, Wissahickon, Philadelphia.

PURCHASED BY THE BOTANICAL SECTION (REDFIELD FUND). Six hundred and fifty-five plants from Texas and the Southern Appalachians.

PURCHASED BY THE ACADEMY. Fifteen hundred plants from Canada.

#### ARCHAEOLOGY.

DR. W. L. ABBOTT. Sleeping and sitting-mats, Madagascar.

WM. E. HUGHES, M. D. Peruvian Indian belt.

CLARENCE B. MOORE. Shell-heap material, Florida.

DR. ELIZABETH SNYDER. Crania and basketry of Cliff Dwellers, Utah.

MISS ANNE THOMSON. Frank Thomson collection of old Indian bead-work, basketry, etc.

IN EXCHANGE. Pottery from the Cliff dwellings, Colorado and New Mexico.

## Reports of Sections.

**BIOLOGICAL AND MICROSCOPICAL SECTION.**—The Biological and Microscopical Section held nine stated meetings during the year, with a slightly increased attendance and membership. The class in microscopic technique formed last year has now become a new association, called the Philadelphia Microscopical Society, and meets at the Wagner Free Institute of Science.

Twenty-three weekly excursions were made to various localities near the city, with an average attendance on each trip of twelve members and their friends.

Communications on various subjects were made by the following: Messrs. Bilgram, Van Sickle, T. C. Palmer, Walter Palmer, Stewart, Keeley, Munro, Poyser, and Boyer.

The Conservator reported the gift from the estate of the late Dr. Benjamin Sharp of two microtomes, one a Rivet, the other a sliding microtome.

The following have been elected officers for the year 1921:

<i>Director</i> .....	T. Chalkley Palmer
<i>Vice-Director</i> .....	John A. Shulze
<i>Recorder</i> .....	Charles S. Boyer
<i>Corresponding Secretary</i> .....	Walter Palmer
<i>Treasurer</i> .....	Thomas S. Stewart, M. D.
<i>Conservator</i> ..	F. J. Keeley

CHARLES S. BOYER,  
*Recorder.*

**BOTANICAL SECTION.**—The Botanical Section has continued to encourage botanical activity at the Academy especially through the meetings of the Philadelphia Botanical Club which have been held in the herbarium during the year.

Officers of the section elected for 1921 at the annual meeting of the section are:

<i>Director</i> .....	Joseph Crawford
<i>Vice-Director</i> .....	Alexander MacElwee
<i>Recorder</i> .....	John W. Eckfeldt, M. D.,
<i>Treasurer and Conservator</i> .....	Stewardson Brown.

ENTOMOLOGICAL SECTION.—The Entomological Section has held its usual meetings which have been well attended. Many interesting communications were made by members and occasional visitors. Mr. David E. Harrower of Philadelphia was elected a member, and Mr. A. B. Heideman a contributor.

The officers and committee elected to serve for 1921 are:

<i>Director</i> .....	Philip Laurent
<i>Vice-Director</i> .....	R. C. Williams, Jr.
<i>Recorder</i> .....	E. T. Cresson, Jr.
<i>Secretary</i> .....	J. A. G. Rehn
<i>Treasurer</i> .....	E. T. Cresson
<i>Publication Committee:</i>	E. T. Cresson, E. T. Cresson, Jr., P. P. Calvert, Ph. D.

MINERALOGICAL AND GEOLOGICAL SECTION.—During the past year, the Section suffered an irreparable loss by the death of its Director, Benjamin Smith Lyman.

Owing to this, and the previous illness of Mr. Lyman, but few meetings were held, and the principal activities of the section were confined to the excursions, which, jointly with the Biological and Microscopical Section, were made every Saturday during the Spring and Fall months.

At the annual meeting the following officers were elected to serve during the ensuing year:

<i>Director,</i> .....	F. J. Keeley
<i>Vice-Director</i> .....	T. Chalkley Palmer
<i>Conservator</i> .....	George Vaux, Jr.
<i>Treasurer</i> .....	Dr. Thomas S. Stewart
<i>Recorder and Secretary</i> .....	Samuel G. Gordon.
	F. J. KEELEY,
	<i>Director.</i>

ORNITHOLOGICAL SECTION.—The Ornithological Section has been active during the year in advancing the ornithological interests of the Academy. The Delaware Valley Ornithological Club has held regular meetings in the ornithological rooms and the Pennsylvania Audubon Society has held two largely attended meetings in the

Lecture Hall with lectures by William L. Finley and Robert Cushman Murphy.

Officers of the Section elected for 1921 are:

<i>Director</i> .....	Spencer Trotter, M. D.
<i>Vice-Director</i> .....	George Spencer Morris
<i>Recorder</i> .....	Stewardson Brown
<i>Secretary</i> .....	William A. Shryock
<i>Treasurer and Conservator</i> .....	Witmer Stone.

## Public Lectures.

With the coöperation of the Ludwick Institute two courses of free, illustrated, public lectures were given by members of the scientific staff and others. These were arranged with the object of presenting popular information on the animal and plant life in the vicinity of Philadelphia, on the results of the explorations of the Academy in the west, and upon general biological problems.

In the Monday evening course, January 5 to April 12, Dr. Witmer Stone lectured on "A Naturalists' Camp in the Chiricahua Mountains, Arizona," and on "Birds' Nests and Nesting Habits".

Dr. J. Percy Moore, on "The Foundations of Organic Evolution".

Mr. J. A. G. Rehn, on "Desert Sojourns of an Entomologist" and "Insect Collecting in the Higher Mountains of the West".

Mr. J. Fletcher Street, on "Spring Wild Flowers" and the "Flora of the Pine Barrens and Coast".

Dr. Spencer Trotter, on "The Mammalia".

Dr. H. A. Pilsbry, on "Oysters and the Oyster Industry", and "The Shell Fish of Our Coasts".

Mr. Henry W. Fowler, on "Tropical Fishes".

Twelve lectures were also given in three of the city High Schools on "Local Birds" and "Local Wild Flowers", by Dr. Stone; "Local Insects", by Mr. Rehn; and "The Oyster Industry", by Dr. Pilsbry.

Dr. Stone, Mr. Rehn, and Mr. Fowler also gave voluntary lectures on the local fauna and flora to school children in the Academy Lecture Hall on Friday afternoons, January 16 to February 27.

In the future it is planned to hold all of the lectures at the Academy, to broaden their scope, and to give some of them on Sunday afternoons.

The lectures form a very important part of the Academy's educational work. Through them the attempt is made to bring vividly before the audience the beauties of nature, the life histories of animals, and the laws underlying the development of animal and plant life; and through the aid of lantern slides to bring city children into close contact with the wild life, which many of them have never had an opportunity to study in reality.



## Library.

### ADMINISTRATION OF THE LIBRARY.

#### LIBRARY COMMITTEE.

HENRY TUCKER, *Chairman*, F. J. KEELEY,  
WITMER STONE, T. CHALKLEY PALMER,  
SPENCER TROTTER.

EDWARD J. NOLAN, *Librarian*,\*  
WILLIAM J. FOX, *Assistant Librarian*.

#### REPORT OF THE LIBRARIAN.

Owing to the continued illness of your Librarian the duties of the office have again been carried on by the Assistant Librarian, Mr. William J. Fox, to whom I make acknowledgment for the following report.

The additions to the library during the past year total 6927, of which 6046 are pamphlets and parts of periodicals, 693 volumes, and 187 maps. There was also received a framed crayon portrait of the late Professor Henry Carvill Lewis, from Mrs. Edward S. Sayres. These figures show an increase of 2103 over the preceding year, which is mainly due to the receipt of books held back by the late war.

They were received from the following sources:

Isaiah V. Williamson Fund.....	2810
Exchange.....	2761
United States Department of Agriculture.....	542
James Aitken Meigs Fund.....	206
Authors.....	67
Editors.....	54
Pennsylvania State Library.....	46
Cornell University Agricultural Experiment Station.....	40

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\*Deceased Jan. 7, 1921.

New York Agricultural Experiment Station.....	32
Museum of the American Indian, Heye Foundation.....	26
Imperial Department of Agriculture, British West Indies.....	25
Thomas B. Wilson Fund.....	23
American Entomological Society.....	20
Trustees of the British Museum.....	16
Comissão de Linhas Telegraphicas Estrategicas do Matto Grosso ao Amazonas.....	16
State Forester, Virginia.....	13
South Dakota Geological Survey.....	12
Ministerio de Marinha e Ultramar, Comissão de Cartographia, Portugal	11
United States Department of Commerce.....	9
Department of Agriculture, State of California.....	9
Utah Agricultural College Experiment Station.....	8
Maryland Geological Survey.....	7
United States War Department.....	7
Dr. Henry Skinner.....	7
Vermont Agricultural Experiment Station.....	7
United States Department of the Interior.....	6
Albert I <sup>er</sup> , Prince de Monaco.....	6
Roger Williams Park Museum.....	6
Dr. Edward J. Nolan.....	6
Dr. Henry A. Pilsbry.....	5
Publication Committee of the Academy.....	5
Indiana University.....	5
Board of Water Supply, New York City.....	4
Statens Skogsförsöksanstalt, Stockholm.....	4
San Diego Museum Association.....	4
National Research Council.....	4
California Fish and Game Commission.....	4
Royal Scottish Museum.....	4
Government of India.....	3
Secretaria de Agricultura y Fomento, Mexico.....	3
F. H. Shelton.....	3
Samuel G. Gordon.....	3
Illinois Geological Survey.....	3
New York State Archeological Association, Morgan Chapter.....	3
Geological Survey of Alabama.....	3
University of Tennessee.....	2
Gouvernements Kina-Onderneming te Tjinjiroen.....	2
Press Bureau, Philippine Mission.....	2
Instituto de Butantan.....	2
Scientific Society of San Antonio.....	2
Ministerio de Agricultura de la Nacion, Argentine Republic.....	2
Dirección de Montes e Minas, Cuba.....	2
Survey of India.....	2
Georgetown University.....	2

Dirección de la Edición Oficial de las Obras y Correspondencia de Florentino Ameghino.....	2
Serviço Sanitário do Estado de São Paulo.....	2
Société Hollandaise des Sciences Naturelles.....	2
Howard Crawley.....	2
Hawaiian Sugar Planters' Association.....	2
Texas Agricultural Experiment Station.....	2
Department of Marine and Fisheries, Canada.....	I
Pennsylvania Chamber of Commerce.....	I
University of Wyoming.....	I
Carleton College.....	I
Observatorio de Madrid.....	I
Geological Survey of Georgia.....	I
Jardim Botânico do Rio de Janeiro.....	I
Danish Government.....	I
Tokyo Imperial Museum.....	I
Dr. Charles W. Richmond.....	I
Bureau of Topographic and Geological Survey, Pennsylvania.....	I
Louisiana State Museum.....	I
Henry Fairfield Osborn.....	I
Miss Caroline Ziegler.....	I
Department of Public Works and Buildings, Illinois.....	I
Commissioners on Fisheries and Game, Mass.....	I
William J. Fox.....	I
Zoölogical Society of Philadelphia.....	I
Wagner Free Institute of Science.....	I
Mrs. Edward S. Sayres.....	I
Mechanics' Institute San Francisco.....	I
Bermuda Biological Station for Research.....	I
Delaware Institute of Science.....	I
Michigan College of Mines.....	I
Cuerpo de Ingenieros de Minas del Peru.....	I
Southwest Museum.....	I
Serviço Geologico e Mineralogico do Brazil.....	I
Munitions Resources Commission, Canada.....	I
Dr. John V. Fisher.....	I
St. Louis Natural History Museum Association.....	I
Warren Academy of Sciences.....	I
Entomological Society of Nova Scotia.....	I
Department of Conservation and Development, New Jersey.....	I
Government of Formosa.....	I
Dr. William L. Abbott.....	I
Botanical Survey of South Africa.....	I
Escola Superior de Agricultura e Medicina Veterinaria, Nictheroy.....	I
Clarence B. Moore.....	I
United States Brewers' Association.....	I

They have been distributed to the various departments of the library as follows:

Journals.....	5193
Agriculture.....	681
Geology.....	321
Geography.....	201
Botany.....	113
General Natural History.....	85
Entomology.....	86
Voyages and Travels.....	57
Anatomy and Physiology.....	42
Mineralogy.....	37
Conchology.....	24
Anthropology.....	22
Ornithology.....	15
Medicine.....	11
Bibliography.....	8
Helminthology.....	7
Mammalogy.....	7
Ichthyology.....	6
Physical Sciences.....	6
Herpetology.....	2
Mathematics.....	1
Philology.....	1
Miscellaneous.....	1

The following new journals were added to the library either by purchase or exchange:

- Academia Nacional de Ciencias, Cordoba. Miscelanea.  
 Angewandte Botanik. Berlin.  
 Ardea. Leiden.  
 Association française pour l'Avancement des Sciences. Bulletin.  
 Boston Society of Natural History. Bulletin. Museum Bulletin.  
 Botanical Memoirs. London.  
 Botanical Survey of South Africa. Memoir.  
 Centro de Cultura Scientifica, Pelotas. Revista.  
 Collegio Pedro II, Rio de Janeiro. Anuario.  
 Dirección de Montes y Minas, Habana. Boletín de Minas.  
 Dorset Natural History and Antiquarian Society, Dorchester. Proceedings.  
 Eclogae Geologicae Helveticae. Lausanne.  
 Ethnos. Mexico.  
 Foreign Commerce Series. New York.  
 Geologen-Kalender. Leipzig.  
 Geologiska Kommissionen i Finland. Agrogeologiska Kartor.  
 Institut General y Técnico de Valencia. Anales.  
 Institut d'Égypte. Bulletin. Mémoires.  
 Journal of Mammalogy. Baltimore.  
 Museum of the American Indian, Heye Foundation. Indian Notes and Monographs. Leaflets.

National Research Council. Bulletin. Reprint and Circular Series.  
Pennsylvania Department of Agriculture, Bureau of Plant Industry. Circular.  
Revue Bretonne de Botanique. Rennes.  
Revue de Géologie et des Sciences Connexes. Bruxelles.  
Royal Scottish Museum. Report.  
Serviço Sanitário de Sao Paulo.  
Société des Lettres, Sciences et Arts des Alpes-Maritimes. Annales.  
South Dakota Geological Survey. Bulletin.  
Thoreau Museum of Natural History, Memoir.

A fine copy of the second edition of Elliot, Monograph of the Pittidae, 1893-95, and, Oeuvres Complètes de Buffon (Lacépède), Nouvelle Edition, 17 vols., Paris, 1817-1819, were among the important additions.

Four hundred and ninety volumes have been bound.

Sixty-five pamphlets and parts of periodicals, and 27 volumes were transferred to the Free Library of Philadelphia, not being germane to the Academy's library.

Eleven hundred and six volumes and parts of periodicals were used on the premises by the scientific staff, and 158 volumes were borrowed by members.

My thanks are again due to Miss H. N. Wardle for assistance rendered.

EDWARD J. NOLAN,  
*Librarian.*

## Secretaries—Publications.

### REPORT OF THE RECORDING SECRETARY.

Meetings have been held December 16, 1919; January 20, February 17, March 16, April 20, and November 16, 1920. Communications were made by James A. G. Rehn, Henry W. Fowler, Stewardson Brown, J. Fletcher Street, Leon L. Gardner, and Henry A. Pilsbry.

Papers for publication have been presented by Henry A. Pilsbry (2), Edgar T. Wherry (2), Morgan Hebard (2), Masamitsu Oshima (2), Francis W. Pennell (2), Henry W. Fowler, Howard Crawley, Samuel G. Gordon, E. Penard, Edward G. Vanatta, Sarah P. Monks, James A. G. Rehn, and H. Newell Wardle.

Four hundred and seventeen pages and 12 plates of the PROCEEDINGS were issued.

The Entomological Section (American Entomological Society) published 403 pages and 18 plates of its TRANSACTIONS; 148 pages and 6 plates of MEMOIRS, and 316 pages and 4 plates of the ENTOMOLOGICAL NEWS.

Part 100, completing volume 25, of the MANUAL OF CONCHOLOGY, consisting of 188 pages and 16 plates, was issued under the direction of Dr. Pilsbry.

Altogether, 1324 pages and 56 plates, were published by the several departments of the Academy during the last year.

Fifty-three members were elected, and 18 have died.

Sets of the publications of the Academy, as far as available, were sent to the Académie de Belgique, and the Université de Louvain, to aid in replacing their libraries destroyed during the war. The distribution of the PROCEEDINGS to several of the European countries affected by the war was discontinued for nearly five years. This accumulation, with the exception of that for Germany, Austria, and Russia, was recently dispatched through the International



Exchange Service. As this medium of transmission is not in a position to forward consignments to Germany and Austria until the peace treaties are finally ratified, the last number of the PROCEEDINGS, 1920, part I, was sent by regular mail, as will be the future issues until the usual method of transmission is again available. Conditions in Russia prevent the sending entirely.

The following were elected members during the past year: Astley P. C. Ashhurst, Edward B. Bartram, W. S. Beach, Charles P. Bower, Frank B. Bower, Hamilton Bradshaw, T. Wistar Brown, 3rd., J. E. B. Buckenham, John Cadwalader, 3rd, Sabin W. Colton, Jr., Francis I. DuPont, Richard Erskine, Childs Frick, Samuel G. Gordon, David E. Harrower, Joseph Hepburn, Joseph S. Lovering, W. G. McDaniel, J. Franklin McFadden, Thomas McKean, Frank R. Mason, William W. Matos, Hugh Bradshaw Meredith, Lawrence J. Morris, Hugh F. Munro, Naomi Pennock, Julian K. Potter, Conrad K. Roland, Benjamin Rush, Arthur R. Spencer, D. W. Steckbeck, George H. Stewart, 3rd., Henry Carlisle Stewart, Henry F. C. Stikeman, J. Fletcher Street, C. E. Tobias, Jr., Harry W. Trudell, Rodney H. True, George F. Tyler, Robert F. Welsh, William Chatten Wetherill, Edward R. Wood, Jr., Anna Woolman, and Edward Woolman.

Acknowledgment is again due to Dr. J. Percy Moore, and to Dr. Philip P. Calvert, who in consequence of my continued illness, have kindly acted at the meetings as Recording Secretary, and Recorder of the Council, respectively. The other duties of the office have been performed by Mr. William J. Fox, who has again compiled this report.

EDWARD J. NOLAN,  
*Recording Secretary.*

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#### REPORT OF THE CORRESPONDING SECRETARY.

During the year the deaths of Sir James A. Grant M. D., and of Colonel William C. Gorgas, U. S. A., were announced. The reported decease of other correspondents was not verified. The following named were elected correspondents: Merrit Lyndon Fernald, Hans Frederick Gadow, Johannes Paulus Lotsy, Daniel Trembly MacDougall, Raymond Pearl, William Emerson Ritter, William Schaus, William Lutley Sclater, and William Berryman Scott.

The Hayden Memorial Medal for 1920, on the recommendation

of a committee of geologists, was awarded and presented to Professor Thomas Chrowder Chamberlin, a correspondent.

Invitations to the Academy to send representatives to the following were received: the postponed International Congress of Meteorology in Venice; the fiftieth anniversary exercises of the Wisconsin Academy of Sciences, Arts and Letters, to which Professor John M. Coulter, a correspondent, was appointed a delegate; the Centennial Educational Conference celebrating the founding of Indiana University; the fiftieth anniversary of the opening of Ursinus College; a private view of exhibits in the new museum of the Buffalo Society of Natural Sciences; the Pan-Pacific Scientific Conference at Honolulu at which the Academy was represented by Dr. Henry A. Pilsbry, and, through the National Research Council, to conferences on scientific exploration and research in tropical America and the Philippine Islands, to which Dr. Witmer Stone was appointed the Academy's delegate. In response to these and other invitations suitable letters of congratulation were sent when appropriate.

Invitations were also received to contribute toward the erection in Strasbourg of a permanent memorial to the distinguished chemist, Charles Gerhardt; and to assist in the restoration of the library of the University of Louvain. Toward the latter a set of the Academy's publications were contributed.

A portrait of the late Professor Henry Carvill Lewis presented by his sister, Mrs. Edward G. Sayres, was suitably acknowledged.

A number of appeals were received from scientific individuals and organizations in Austria and Hungary requesting aid of various kinds, rendered necessary by the deplorable economic conditions in those countries resulting from the war. The Academy was unable to respond to these but the letters are on file and available to any individual member who may wish to contribute.

The corresponding Secretary would again point to the desirability of combining this office with that of Recording Secretary with a view to more efficient handling of the Academy's correspondence.

The following tables present the usual statistics of the correspondence for the year.

## Communications received:

Acknowledging the receipt of the Academy's publications.....	123
Transmitting publications to the Academy.....	44
Requesting exchanges or the supply of deficiencies.....	12
Invitations to learned gatherings, celebrations, etc.....	15
Notices of deaths of scientific men .....	4
Circulars concerning the administrati2n of scientific and educational institu- tions etc.....	28
Letters from correspondents and miscellaneous letters.....	104
Total recieved.....	330

## Communications fowarded:

Acknowledging gifts to the Library.....	903
Requesting the supply of deficiencies.....	202
Acknowledging gifts to the Museum.....	71
Acknowledging photographs and biographies.....	6
Letters of sympathy or congratulation, addresses, etc.....	8
Diplomas and notices of election of correspondents, and delegates' eredentials	18
Miscellaneous letters.....	120
Annual reports and circulars sent to eorrespondents.....	271
Total forwarded.....	1589

J. Percy Moore,  
*Corresponding Scretary.*

## Treasurer.

### SUMMARY OF THE ACCOUNTS OF GEORGE VAUX, JR., TREASURER OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, FOR THE FISCAL YEAR ENDING NOVEMBER 30, 1920

#### GENERAL FUND.

##### RECEIPTS.

Income from Investments.....	\$38,112.96
Income from Estate of John Turner, dec'd.....	140.34
Annual Dues.....	2,170.00
Interest on Bank Balances.....	329.69
Publications sold.....	545.80
Income Account of 1309 Arch Street.....	1,193.23
Proceeds of sale of Minerals.....	250.00
Transfers from Funds:-	
Jeanes Fund for Museum Expenses.....	\$ 900.00
Wilson Fund for Librarian's salary.....	300.00
A. H. Smith Fund.....	1,584.00
M. R. D. Smith Fund.....	300.00
H. N. Potts Fund.....	500.00
Jessup Fund, Male Branch.....	510.00
	4,094.00
	\$46,836.02

##### PAYMENTS.

Balance overdraft 29th November 1919.....	\$1,939.81
General Expenses.....	3,523.25
Petty Expenses.....	300.00
Books.....	123.56
Binding.....	798.00
Recording Secretary.....	249.42
Printing PROCEEDINGS.....	1,780.62
Specimens and Expeditions.....	2,493.86
Expenses of Treasurers' Department.....	515.00
Salaries in Curators' Department.....	26,051.29

Salaries in Librarian's Department .....	4,711.18
Mary S. Warren, on account of 1309 Arch Street .....	1,800.00
Estate of Robert H. Lamborn, dec'd., for taxes etc. on lands in Colorado .....	655.10
Corresponding Secretary .....	25.00
Balance on hand 30th November, 1920 .....	1,869.93
	<u>\$46,836.02</u>

## CONCHOLOGICAL SECTION FUND.

## RECEIPTS.

Balance overdrawn 29th November 1920 .....	\$1,304.96
Net Income collected .....	621.31
	<u>\$1,926.27</u>

## PAYMENTS.

Balance overdrawn 30th November, 1919 .....	\$1,726.27
Cash to S. Raymond Roberts .....	200.00
	<u>\$1,926.27</u>

## COPE COLLECTION FUND.

## RECEIPTS.

Balance 29th November, 1919 .....	\$1,582.23
Net Income collected .....	782.87
Balance 30th November, 1920 .....	<u>\$2,365.10</u>

## F. V. HAYDEN MEMORIAL FUND.

## RECEIPTS.

Balance on hand 29th November, 1919 .....	\$104.51
Net Income collected .....	102.22
Balance overdrawn 30th November 1920 .....	50.99
	<u>\$257.72</u>

## PAYMENTS.

Cash to William Evans Wood for medal awarded to Thomas Chrowder Chamberlin, Ph. D., LL. D. ....	\$257.72
	<u>\$257.72</u>

## HORACE N. POTTS FUND.

## RECEIPTS.

Balance on hand 29th November 1919.....	\$4,873.88
Net Income collected.....	41.64
	<u>\$4,915.52</u>

## PAYMENTS.

Cash transferred to Girard Trust Company, being proceeds of sale of Potts Farm.....	\$4,358.36
Cash transferred to General Fund in accordance with appropriation.....	500.00
Balance on hand 30th November, 1920.....	57.16
	<u>4,915.52</u>

## MARY JEANES MUSEUM FUND.

## RECEIPTS

Balance on hand 20th November, 1919.....	\$ 61.48
Net Income collected.....	851.61
	<u>\$913.09</u>

## PAYMENTS.

Transferred to General Fund for Museum Expenses.....	\$900.00
Balance on hand 30th November, 1920.....	13.09
	<u>\$913.09</u>

## JESSUP FUND, MALE BRANCH.

## RECEIPTS.

Balance on hand 29th November, 1919.....	\$924.50
Net Income collected.....	630.03
	<u>\$1,554.53</u>

## PAYMENTS.

Salaries to Students.....	\$360.00
Transferred to General Fund in accordance with appropriation.....	510.00
Balance on hand 30th November, 1920.....	684.53
	<u>\$1,554.53</u>



## JESSUP FUND, FEMALE BRANCH.

## RECEIPTS.

Balance on hand 29th November, 1919.....	\$110.17
Net Income collected.....	222.86
	<u>\$333.03</u>

## PAYMENTS.

Salaries to students.....	\$240.00
Balance on hand 30th November, 1920.....	93.03
	<u>\$333.03</u>

## J. A. MEIGS LIBRARY FUND.

## RECEIPTS.

Balance on hand 29th November, 1919.....	\$612.89
Net Income collected.....	520.24
	<u>\$1,133.13</u>

## PAYMENTS.

Books purchased.....	\$970.27
Balance on hand 30th November, 1920.....	162.86
	<u>\$1,133.13</u>

## J. H. REDFIELD MEMORIAL FUND.

## RECEIPTS.

Balance on hand 29th November, 1919.....	\$165.27
Net Income collected.....	171.92
	<u>\$337.19</u>

## PAYMENTS.

Stewardson Brown, Treasurer of Botanical Section.....	\$165.27
Balance on hand 30th November 1920.....	171.92
	<u>\$337.19</u>

## MARY REBECCA DARBY SMITH FUND.

## RECEIPTS.

Balance on hand 29th November 1919.....	\$350.40
Net Income collected.....	62.61
	<u>\$413.01</u>

## PAYMENTS.

Transferred to General Fund in accordance with appropriation.....	\$300.00
Balance on hand 30th November, 1920.....	113.01
	<u>\$413.01</u>

## AUBREY H. SMITH FUND.

## RECEIPTS.

Balance on hand 29th November, 1919.....	\$2,594.13
Net Income collected.....	735.52
	<u>\$3,329.65</u>

## PAYMENTS.

Transferred to General Fund in accordance with appropriation.....	\$1,584.00
Balance on hand 30th November, 1920.....	1,745.65
	<u>\$3,329.65</u>

## FRANCIS LEA CHAMBERLAIN FUND.

## RECEIPTS.

Balance on hand 29th November, 1919.....	\$369.55
Net Income collected.....	110.83
	<u>\$480.38</u>

## THOMAS B. WILSON FUND.

## RECEIPTS.

Balance on hand 29th November, 1919.....	\$317.37
Net Income collected.....	467.78
	<u>\$785.15</u>

## PAYMENTS.

Books purchased:.....	\$250.00
Transferred to General Fund for Librarians' Salary.....	300.00
Balance on hand 30th November, 1920.....	235.15
	<u>\$785.15</u>

## WILLIAM S. VAUX FUND.

## RECEIPTS.

Balance on hand 29th November, 1919 .....	\$1,296.88
Net Income collected .....	525.90
	<hr/>
	\$1,822.78

## PAYMENTS.

Minerals purchased .....	\$261.35
Balance on hand 30th November, 1920 .....	1,561.43
	<hr/>
	\$1,822.78

## I. V. WILLIAMSON FUND.

## RECEIPTS.

Balance on hand 29th November, 1919 .....	\$ 540.59
Net Income collected .....	1,666.59
	<hr/>
	\$2,207.18

## PAYMENTS.

Transferred to Girard Trust Company, balance income in this account for investment .....	\$ 540.59
Books and journals purchased .....	1,628.08
Balance on hand 30th November, 1920 .....	38.51
	<hr/>
	\$2,207.18

## SPECIAL DONATIONS.

## RECEIPTS.

Balance on hand 29th November, 1919 .....	\$589.38
Received from "A Friend" for the purchase of birds .....	100.00
	<hr/>
Balance on hand, 30th November, 1920 .....	\$689.38

## J. F. BEECHER MEMORIAL LABORATORY FUND.

## RECEIPTS.

Balance on hand 29th November, 1919 .....	\$1,511.21
Net Income collected .....	718.62
	<hr/>
	\$2,229.83

## GENERAL ENDOWMENT FUND.

## RECEIPTS.

Balance on hand 29th November, 1919.....	\$194.11
Net Income collected.....	179.68
	<hr/>
	\$373.79

Respectfully submitted,

E. and O. E.  
Philadelphia.

GEORGE VAUX JR.,  
*Treasurer.*

November 30, 1920.

We herewith report that we have made an audit of the books and accounts of George Vaux, Jr., Esq., Treasurer of the Academy of Natural Sciences of Philadelphia, for the fiscal year ended November 30th, 1920.

As a result of our audit we certify that the above statements are in accord with the Treasurer's books and are in our opinion correct.

All the income received during the year was properly accounted for and entered upon the books. The payments, as shown by the Cash Book, were properly supported by statements, checks, or vouchers, and were found to be correct. A reconciliation of the deposit account with the Girard Trust Co., was made by us and the correctness of the Cash Balance as shown by the Treasurer's books verified thereby.

(Signed) Edward P. Moxey & Co.,  
*Certified Public Accountants*

## REPORT OF THE TREASURER OF THE MANUAL OF CONCHOLOGY

The Treasurer of the "MANUAL OF CONCHOLOGY" respectfully reports that: During the year ending December 1, 1920, the receipts from all

sources were.....	\$ 969.79
And disbursements.....	1,006.93
	<hr/>
Leaving a deficit of.....	\$37.14
Deducting this from balance on hand December 1, 1919.....	220.95
	<hr/>
Leaves balance December 1, 1920.....	\$183.81
	<hr/>
Divided "Manual" account.....	\$28.06
Special Deposit Wesley and Son, London.....	155.75
	<hr/>
	\$183.81

The receipts were as follows:

From Collections for account Vol. XXIV.....	\$8.00
" Collections for account Vol. XXV.....	496.76
" Sale of back volumes and parts.....	234.05
" The Academy of Natural Sciences.....	200.00
" Henry A. Pilsbry.....	25.00
" Interest on daily Bank Balances.....	5.98
	<hr/>
	\$969.79

The disbursements were:

For Colorists.....	\$90.00
" Lithographing and sizing plates.....	299.32
" Paper and printing.....	409.24
" Postage and expressage.....	21.45
" Advertising.....	4.00
" Purchase of back volumes.....	80.00
" Protested draft.....	76.42
" Transfer from Deposit Account Wm. Wesley and Son for parts 96, 100.....	26.50
	<hr/>
	\$1,006.93
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The Publication Committee of the Academy having assumed payment of salaries of Editor, Conservator, and Draughtsman, the "Manual" is relieved of a large item of expense, and the payments made by its Treasurer are now confined to cost of manufacture and issue of the parts.

E. and O. E.

Respectfully submitted,

S. RAYMOND ROBERTS,  
*Treasurer.*

December 1, 1920





















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